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EXAMINER				
HU, HENRY S				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/549,921

Applicant(s)

NODONO, MITSUNORI

Examiner

HENRY S. HU

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Election of April 29, 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 8-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☒ Claim(s) 1 and 3-7 is/are objected to.
- 8) ☒ Claim(s) 1-12 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Paper No(s)/Mail Date _____
- 6) ☐ Other: _____

DETAILED ACTION

1. As discussed earlier, this application is transferred from Examiner **Jonathan Crepeau** of art unit 1795. This Application is a **371/PCT/JP04/04068** with a Japanese priority at March 28, 2003. This Office Action is in response to **two** things including: (A) **Election** filed on April 29, 2009 and (B) new **IDS** (1 page) filed on February 25, 2010. **Applicant's Election of Group I, Claims 1-7 is traversed with remarks on page 2.** The traversal is on the ground(s) that it would not place an undue burden to search and examine the non-elected Group II (Claims 8-12) with the elected Group I since they are so closely related in the field of polymer electrolyte membrane so that the search is not unduly burdensome. This is not found persuasive because Groups I and II are each drawn to a technology requiring search in different classification area. In the instant case, Group I is related to **a process of making a polymer electrolyte membrane (PEM)** (Claim 1-5), the product made (Claim 6) and its application in fuel cell (Claim 7), while Group II is related to quite different subject matter such as apparatus. It is noted that open language “comprising” is applied to the process of Claim 1 and the apparatus of Claim 8.

As discussed earlier, each group may use the same polymer electrolyte as specified in Group I, many other factors are indeed and routinely involved in the making or using as known in the art. They are in different combination and may be prepared through different process and/or stayed on different form. They are thereby not equivalent and interchangeable.

2. The requirement for this PCT case is still deemed proper and is therefore made FINAL. Applicants' **one Pre-Amendment** and **four IDS**' (1 page each) are filed so far. With such a pre-amendment, only Claim 3 is amended to remove the multiple claim dependency, while no claim is cancelled or added. Examiner **accepts Applicants' four drawing sheets with Figures 1-4** filed along with this application (a brief description is on page **4**). **Claims 1-12 with two independent claims (Claim 1 and Claim 8) are now pending**, while non-elected **Claims 8-12** (Group II) are withdrawn from consideration. An action follows. (Only **three** "A"-cited references are found in international search report in Applicants' priority paper **WO 2004/088678 A1 to Nodono for PCT/JP2004/004068**)

Claim Objections

3. **Claims 1 and 3-7 are objected to** because of the following informalities:

(a) On **Claim 1** at lines 1 and 3 as well as on **Claims 3-7**, the wording such as "polymerelectrolyte" is wrong. It needs to be changed to "**polymer electrolyte**" with spacing.

(b) On **Claim 1** at line 5, the language as "laminating the coated porous substrate and a supporting material while applying a tension F (kg/cm)" is improper. It is unclear whether the laminating step is applied on the coated porous substrate, the supporting material, or on both.

Rewriting with clarification is needed.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The limitation of parent **Claim 1** in present invention relates to **a process for producing a polymerelectrolyte membrane.** The process comprises two steps including:

(A) coating a solution of a polymerelectrolyte on at least one surface of a porous substrate; and

(B) laminating the coated porous substrate and a supporting material while applying a tension F (kg/cm) in a range of the following expression (A) to the coated porous substrate.

$$0.01 \leq F \leq 10 \quad (A)$$

See other limitations of dependent Claims 2-7.

Art Unit: 1796

6. **Claims 1-3 and 6-7** are rejected under 35 U.S.C. **102(a) and/or 102(e)** as being anticipated by **Stone et al.** (US 2003/0059657 A1), or under 35 U.S.C. **102(e)** as being anticipated by **Kosako et al.** (US 2003/0158273 A1).

Regarding “**the process of making a polymer electrolyte membrane (PEM)**” of parent **Claim 1**, it is achieved by comprising **two** steps including: (A) **coating a solution of a polymer electrolyte** on at least one surface of a porous substrate; and (B) **laminating** the coated porous substrate and a supporting material **while applying a tension F kg/cm being in the range of 0.01 and 10**. Open language “**comprising**” is applied to the process of parent Claim 1.

7. **Stone and/or Kosako** have already disclosed the preparation of some proton-conducting electrolyte type membranes (PEM) along with its derived device in multilayer architect to be particularly useful for **fuel cell operation**. The preparation is achieved by fundamentally comprising the above-mentioned **two** steps including: (A) **step of impregnating** the porous base material with some sulfonic acid-containing polymer electrolyte solution, followed by (B) **step of laminating** so as to achieve the desired multilayer architect. It is noted that laminating is certainly and routinely done with some pressure according to the art. **Such a pressure is believed to fall in the claimed tension F kg/cm range of 0.01 and 10**.

8. To be specific, see **Stone** at title; abstract; paragraphs 0012-0034; particularly paragraphs 0028-0034 for the use of “sulfonic acid-containing ionomer” as PE membrane material and “the

Art Unit: 1796

impregnation and/or coating by PE solution”; see **“laminating with pressure”** at paragraph 0006; see application on **“fuel cell”** at paragraphs 0002-0003.

9. See **Kosako** at title; abstract; see the use of “sulfonic acid-containing ionomer” as PE membrane material at Figures 12-13; see **“the impregnation and/or coating by PE solution”** at paragraphs 0110, 0127 and 0133; see **“laminating with pressure”** at paragraph 0058; see application on **“fuel cell”** at paragraphs 0002 and 0032.

10. Dependent **Claims 2-3 and 6-7** have been disclosed and/or suggested by the above-mentioned references and the cited references therein.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

Art Unit: 1796

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. **Claims 4 and 5 are rejected** under 35 U.S.C. 103(a) as being unpatentable over **Stone et al.** (US 2003/0059657 A1) and **Kosako et al.** (US 2003/0158273 A1), in combination or alone in view of **Sato et al.** (US 6,589,690 B1) and **Yoshio et al.** (JP 06-029032).

The rejections over **Stone and Kosako** set forth above for Claims 1-3 and 6-7 is incorporated here by reference. Regarding **Claims 4 and 5, Stone and Kosako** in combination or alone is “only” silent about using the specified range in the viscosity (Claim 4) and concentration (claim 5) for PE solution.

13. **Sato and Yoshio** in combination have explicitly taught using such two subject matters in the course of making PE solution for the same impregnating purpose. For one instance, **Sato** has disclosed that the viscosity of PE solution for impregnating purpose is better to be kept in the range of **3cp to 20 cp** at a temperature of 20 °C. See column 4, line 21-25 and 45-46; column 3, line 54-57. By doing so, the advantage is that better impregnating and homogeneous result can be effectively achieved.

14. For the other instance, **Yoshio** has disclosed that the concentration of PE solution for impregnating purpose is better to be kept in the range of **1-5 wt%**. See paragraphs 0011-0012

Art Unit: 1796

and 0006; particularly see paragraph 0012 at line 1. By doing so, the advantage is that better impregnating and homogeneous result can be effectively achieved.

15. In light of the fact that all involving references are dealing with making proton-conducting membrane particularly in multilayer architect for fuel cell application and the proton exchange or proton conductivity is thereby the current key issue, one having ordinary skill in the art would therefore have found it obvious to modify **Stone and/or Kosako's** process of making PE membrane by applying and/or further including the above-mentioned conditions for making PE impregnating solutions as taught by **a combination of Sato and Yoshio**. One advantage is that by including such an extra step or condition, better and homogeneous impregnating result can be effectively achieved. Accordingly, better and more efficient fuel cell may be obtained.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a process for producing a polymerelectrolyte membrane. The process comprises: coating a solution of a polymer electrolyte on a porous substrate; and laminating while applying a tension F (kg/cm) as specified: **US 5,910,378 to Debe et al.** only discloses the making of some **multiple-layered membrane** to be useful as **components for membrane-electrode assemblies**. Laminating step may be used. See column 18, line 64 – column 19, line 28; column 20, line 4-6. However, the impregnating with polymer electrolyte (PE) in the form as solution is not disclosed or suggested.

17. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The fax number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1796

/Henry S. Hu/
Examiner, Art Unit 1796

February 26, 2010